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people often are with good advice. Notwithstanding this discouraging result, I venture, as a parting word, to repeat the suggestion, and to say to all the more or less acute lay and clerical paper-philosophers¹ who venture into the regions of biological controversy: Get a little sound, thorough, practical, elementary instruction in biology.

ON THE PEOPLING OF AMERICA.

BY AUG. R. GROTE.²

THE conclusion was first reached by myself in a paper³ read before the American Association, August, 1875 (since reprinted in several journals), that we should find colonies of Arctic man upon mountains in the temperate zone of North America, had all the conditions for his survival on these elevations been fulfilled in his case as they have been in that of certain plants and animals. That the Eskimos are the existing representatives of the man of the American Glacial epoch, just as the White Mountain butterfly (*Oeneis semidea*) is the living representative of a colony of the genus planted on the retreating of the ice from the valley of the White Mountains, seemed to me at that time a natural conclusion. In a subsequent paper,⁴ Dr. C. C. Abbott, basing his remarks on paleolithic implements discovered by himself in New Jersey, says: "It is fair to presume that the first human beings that dwelt along the shores of the Delaware were really the same people as the present inhabitants of Arctic America." The title of Dr. Abbott's paper is Traces of an American Autochthon, and in it he institutes a comparison of the paleolithic implements of New Jersey with those of Southern France. According to a foot-note of Dr. Abbott's it appears that in 1875 Dr. Rink⁵ was "strongly of opinion that the Eskimo are an

¹ Writers of this stamp are fond of talking about the Baconian method. I beg them, therefore, to lay to heart these two weighty sayings of the herald of Modern Science: —

"Syllogismus ex propositionibus constat, propositiones ex verbis, verba notionum tesserae sunt. Itaque si notiones ipsae (*id quod basis rei est*) confusae sint et temere a rebus abstractae, nihil in iis quae superstruuntur est firmitudinis." — Novum Organon ii. 14.

"Huic autem vanitati nonnulli ex modernis summa levitate ita indulserunt, ut in primo capitulo Geneseos et in libro Job et aliis scripturis sacris, philosophiam naturalem fundare conati sint; *inter vivos querentes mortua*." — Ibid. 65.

² Read before the Buffalo Society of Natural Sciences, February 2, 1877.

³ Effect of the Glacial Epoch upon the Distribution of Insects in North America, Proc. Am. Assoc. Adv. Sci., Detroit Meeting, B. Natural History, 225.

⁴ Am. Nat., June, 1876, 329.

⁵ Tales and Traditions of the Eskimo, London, 1875.

indigenous American people who have been pushed northwards by the intrusive Indian tribes." A note of mine in objection to the idea that paleolithic man in North America is an "autochthon" will be found in *The American Naturalist* for July, 1876, p. 432.

It will be seen that, independently of each other and from different stand-points, the fact that we have in the Eskimo a survival of paleolithic man in North America has been arrived at by Dr. Abbott and, previously, by myself. The subsequent discovery by Professor Dana¹ of remains of the reindeer in glacial deposits in the valley of the Connecticut, and the determination of the beds in which the rough stone implements were found as ancient moraines, help to assign a geological age to the presence of man in North America, as well as to give a picture of his surroundings. I have endeavored to carry out the original idea which I entertained, that glacial man would be found to have suffered an equal fate with the fauna of the Ice period, by a study of migrations.

In a lecture delivered in the course of the Buffalo Society of Natural Sciences² January 6, 1877, I published the conclusions arrived at, already briefly sketched in my note in *The American Naturalist* for July of the preceding year. I proposed to distinguish: "A *primitive* migration, one influenced solely by physical causes affecting man's existence, and which must have been in more extensive operation in early times when he was unprovided with means of his own invention against unfriendly changes in his surroundings. Such migrations, or a modified survival of them, are operative now among our Indians, who move from place to place with the game upon which they subsist and with the season. A *culture* migration, one arising out of a certain stage of intellectual advancement when the movements of man are determined by ultimate and not immediate considerations. The movements of the Indo-European races fall within this category. Besides these is to be distinguished an *accidental* migration, which man has submitted to against his will. The accidental migrations of man may be considered as belonging to the epochs of culture migration, since they must more usually have occurred with races advanced in the art of navigation. A separation of individuals from communities under the pressure of storms, earthquakes, volcanic eruptions, etc., may have happened, however, in the earliest times."

¹ *Am. Jour. Sci. Arts*, 353, November, 1875.

² *Buffalo Courier*, January 7, 1877.

It will be seen that I differ from Dr. Abbott by considering the presence of the progenitors of the Eskimo over the main belt of this continent during the Ice period as due to "a primitive and unconscious migration determined by the shifting of their congenial surroundings." It does not appear that Dr. Rink couples the migration of the Eskimo with the movement of the ice over this continent. Indeed, his idea seems opposed to this, and does not imply any relation between the Eskimo and the Ice period.

These discoveries and considerations open up the question of Tertiary man. It is certain, as I have elsewhere suggested, that man could not have originated at the foot of the glacier. The ice must have met him, towards the close of the Tertiary, in the northern parts of Asia and America and forced him southward; or, at a later time, it must have found him on the main belt of this continent. The Tertiary origin of man is presupposed from the fact that he had submitted to a race modification fitting him to endure the cold. Some support for these ideas may be found in examining northern strata; it must be borne in mind, however, that the north has never been free from ice since the close of the Pliocene to this day.

It would appear more sensible, in view of the present ascertained facts of science, that for the original Tertiary form of man we should search a territory inhabited at that time by animals the nearest related to him. Considerations of this kind will prevent us from entertaining the belief that man originated in America. We must still believe that America has always been for man the New World.

If we turn to the detached Antarctic lands, covered by glaciers descending to form an ice wall along their coasts, to be fretted away by the beating of the ocean waves, we see that other sciences may be advanced by their exploration, but anthropology only indirectly. In February, 1842, Ross reached the most southern point yet attained, lat. $78^{\circ} 11'$, long. $161^{\circ} 27'W.$, and it is strange that both he and Weddell¹ report an open sea before them to the south, as Kane did to the north.

So soon as Arctic America is explored by means of the establishment of permanent stations of observation, akin to that in operation on Mount Washington, a system recently recommended in this country as well as in Europe, important data as to the introduction of man on this continent cannot fail to be brought to light. The establishment of an international scien-

¹ Neumayer, *Zeits. Ges. Erdk.*, 1872.

tific service for the observation of astronomical, meteorological, geological, and zoölogical phenomena commends itself at the present time to the more civilized powers. The different governments established by the white races should contribute their quota of the expenses for the establishment and maintenance of posts of observation in different localities over the globe, to be decided upon by commissions of specialists. In time of war such posts should be held neutral, as well as their service, under a flag and protected by the operation of international law. In the case of the Arctic regions, Great Britain, the United States, Russia, and Scandinavia are the more interested from their geographical position; yet other powers are directly interested in the solution of the different problems which will be offered though the knowledge of those parts of the earth's surface. In Madagascar we must also expect some evidence to be forthcoming with reference to the origin of man. A definite settlement of the latter question can be arrived at if evolution be true. Is not this a question to call for the active interest of the cultivated races? Its settlement would greatly advance our material interests as a species by giving us a mental habit in accordance with the facts in the case. I think that the prospect alone of arriving at a solution of this question should prompt concerted action, either by a scientific service or such other means as experience may prefer.

When we examine into the question of the stone implements, which prove the fact of the presence of man, we must see that the earlier man must have first used a stone as he found it. "There must have been a time when men picked up such stones as came in their way at the moment with which to throw at animals, to break their food, to injure their fellow men. Such stones, unaltered by use, can no longer be identified." There will be an imperfection here in the record from implements.

The difficulty of supposing man to have been first introduced into America during the Quarternary period lies in the fact that he must have been in the Stone age when the migration was made. This difficulty vanishes if, as I suppose, man entered upon possession of this continent during the Pliocene and before the Ice period had interfered with a warm climate in the north. This will leave us free to consider American civilizations indigenous. The idea is here suggested that the Ice period acted as a barrier to inter-communication between Asia and North America. The part allowed hitherto by anthropologists to accidental migration

in the peopling of North America will be found, I think, exaggerated. We may conceive that this peopling was effected during the Tertiary; that the ice modified races of Pliocene man, existing in the north of Asia and America, forced them southward, and then drew them back to the locality where they had undergone their original modification. Also, we may suggest that other than Arctic man may have existed across the main belt of this continent during the Pliocene, and that his subsequent intellectual development, as we find it recorded in the West, Mexico, and South America, etc., is the result of his environment acting upon his isolated condition.

The object of the present paper is to call attention to this hypothesis, which must be studied from the point of view that man's earlier migrations were not distinguishable in kind from those of lower animals. It seems to me quite evident that, at a time when instinct was developing into reason, the migrations of man must have had a motive which was not far removed from that influencing certain lower animals under the same circumstances. If we concede this, it follows that the objects of man's primitive migrations were more immediate, and of his culture migrations more remote. This one fact, that the distribution of man over the surface of the globe is more general than that of any other animal, will support the view that, through the fertility of his resources, he has been able to outgrow the limitations originally imposed upon him. But these resources must have been brought into play by experience; and their cost was surely the premature perishment of many of the kind.¹ During the process, then, which resulted in the race modification of the Eskimos, their original numbers must have been decreased by the slowly but ever increasing cold of the northern regions, until experience and physical adaptation combined brought them to a state of comparative stability as a race.

We must also consider that the farther back we go the nearer we must come to a common race of man, supposing the theory of the essential unity of his origin to be true, while I think the probable effect of the Ice period upon climate and the present development of man has not been hitherto sufficiently considered. The entire environment must be taken into consideration,

¹ Many birds witness the death of their companions by the hunter with indifference when first discovered by man, but afterwards, from observation, avail themselves of all their natural means to escape from the danger. It is possible that it was not difficult for Tertiary man to supply himself with animal food even with his imperfect weapons.

however complex it is and at whatsoever cost to us the knowledge of it is to be attained, before we can grasp the true picture of the succession of events which have resulted in man as we now find him on the different lands of the globe. With the thinking minds of our race, the question of the origin of man is the question of the century.

The hypotheses as to the manner in which the early peoplings of America were effected, developed in the present and previous papers of mine, are as follows:—

(1.) That during the Tertiary period man had spread from Equatorial lands on the eastern hemisphere to Northern Asia, and had then crossed into America from the North.

(2.) That in at least as early as Pliocene time man had migrated down the high lands adjacent to the mountainous backbone running along the western side of the two Americas.

(3.) That the Ice-period produced a race modification of the man living in the extreme north, and that the advance of the ice prevented further communication between the Old and the New Worlds until comparatively recent times.

(4.) That this race accompanied the great glacier on its advance and retirement over North American territory, and that the existing representatives of this race are the Eskimos.



THE POLAR COLONIZATION PLAN.

BY CAPT. H. W. HOWGATE, U. S. N.

THE expeditions of Captain Hall in the *Polaris*, in 1871, and of Captain Nares in the *Alert* and *Discovery*, in 1875, have shown that by the use of steam it is a comparatively easy matter to reach the entrance to Robeson's Channel in latitude 81° north, and that the serious difficulties to be overcome in reaching the Pole lie beyond that point. Parties from the two expeditions have made fair surveys one hundred and forty miles north of this, leaving only about four hundred miles of unexplored region between that and the goal of modern geographers,—the Pole.

When Captain Hall reached the upper extremity of Robeson's Channel the lookout of the *Polaris* reported open water in sight and just beyond the pack which surrounded the vessel and prevented further progress. This open water was afterwards seen from the cape at the northern opening of Newman's Bay, and it